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ADDENDUM 068 TO THE AFRICAN FEDERATION TREATY FRAMEWORK©

Sovereign Asset Parity: An Analytical Framework for Correcting Systematic Undervaluation in African Sovereign Creditworthiness Assessment

WORKING PAPER / POLICY INSTRUMENT

David Okiki Amayo Jr.

Founder and Chairman, Africa's Sovereign Development Trust® (ASDT®)
Nairobi, Kenya

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X: @DavidOkikiAmayo

LinkedIn: David Okiki Amayo Jr.

Abstract

Africa holds $29.5 trillion in verified mineral reserves against $1.152 trillion in external sovereign debt. The ratio of minerals alone to total external obligations is 25.6 to 1. When all verifiable sovereign asset classes are incorporated, including agricultural land, Exclusive Economic Zone resources, and freshwater endowments, the Sovereign Asset Parity Index (SAPI) yields a continental score of 33.7, indicating that the continent is more than thirty-three times collateralised against its external sovereign obligations. The standard creditworthiness frameworks applied to African sovereigns by the International Monetary Fund, the World Bank, and the three principal credit rating agencies compute this ratio nowhere.

This paper introduces the Sovereign Asset Parity Index (SAPI) and the Mineral-Adjusted Creditworthiness Assessment (MACA) as corrective instruments for this documented omission. The SAPI measures the ratio of total verified sovereign asset value to total external sovereign debt. The MACA incorporates the SAPI as its primary domain within a composite creditworthiness framework alongside conventional debt service, revenue diversification, and institutional capacity metrics, producing an adjusted credit score applicable across all 54 African states.

Both instruments are proposed as analytical inputs for the African Sovereign Development Finance Fund© (ASDFF©), the continental capital vehicle operating under the African Federation Treaty Framework© (Amayo, 2026a), with OmniGaza® providing the evidentiary and transactional substrate (Amayo, 2025b). Together, the AFTF©, the SAPI, the MACA, the ASDFF©, and OmniGaza® constitute a cohesive institutional ecosystem in which the SAPI and MACA provide the analytical basis for a continental sovereign finance architecture that reflects what Africa owns. Country-level SAPI scores are presented for 49 African states, and the complete African Sovereign Debt Cartography, covering all 55 AU member territories, is reproduced in full from the companion article, *The Debt Cartography* (Amayo, 2026b), as the primary evidentiary table on which this paper's analytical framework rests.

1. Introduction

The architecture of African sovereign credit assessment rests on a category error. External creditworthiness is computed as a function of debt levels, debt service capacity, fiscal balances, and macroeconomic volatility indicators. It does not compute what the sovereign owns.

There is a clarifying analogy from private credit. A bank evaluating a mortgage application does not assess only the borrower's monthly income and credit history. It assesses the value of the property being purchased and holds it as security against the loan. A borrower with a modest income and a property worth ten times the loan amount is treated as a low-risk counterpart. A borrower with the same income and no property is treated differently. This distinction, elementary in private credit markets, is absent from the framework governing how African sovereign debt is assessed, priced, and managed. The income is examined. The property is ignored.

The 54 states of the African continent hold, collectively, the largest concentration of verified mineral reserves on the planet. The Democratic Republic of Congo alone holds an estimated $29.5 trillion in in situ mineral wealth, principally coltan, cobalt, copper, and lithium, at current commodity prices (Africa Finance Corporation, 2026). The continent's total verified mineral reserve value stands at $29.5 trillion at mine-site valuation, the most conservative methodology available, because mine-site valuation excludes by definition all processing, refining, and manufacturing value added, meaning the figure is a documented floor estimate, with no ceiling projection implied. The continent's total external sovereign debt, as of end-2023, was $1.152 trillion, a figure that had risen from $1.12 trillion in 2022 and formed part of gross government obligations exceeding $1.8 trillion when domestic liabilities are incorporated (World Bank, 2024).

The ratio of verified mineral reserves to external debt, expressed in current USD, is 25.6 to 1.

No existing sovereign credit rating incorporates this ratio. The IMF's Debt Sustainability Analysis for Low-Income Countries does not incorporate it. The Composite Indicator Assessment applied to Market Access Countries does not incorporate it. The sovereign rating methodologies of Moody's Investors Service, S&P Global Ratings, and Fitch Ratings, as each publicly documents them, do not incorporate it. The result is that African sovereigns are systematically rated below the risk profile implied by their actual collateral position, and the cost of that underrating is measurable: $163 billion in annual debt service payments on obligations that, in many cases, are underpinned by in situ assets worth multiples of the debt stock (African Development Bank, 2024).

The Botswana case has established the empirical relationship between in situ mineral ownership and creditworthiness outcomes since 1975. With external debt of approximately $3 billion and the Debswana 50% equity joint venture converting diamond reserve value into recurring, predictable government revenue, Botswana maintains the continent's strongest sub-Saharan sovereign credit profile and the lowest external debt-to-GDP ratio among comparable resource-rich African states (IMF WEO, 2025). Botswana did not become creditworthy by repaying its debts more reliably than its neighbours. It became creditworthy by converting a static asset ratio into a fiscal flow, which is precisely what the SAPI measures and what the MACA rewards. The continental application of that logic is the institutional proposition this paper advances.

This paper introduces two instruments to address the identified gap. The Sovereign Asset Parity Index (SAPI) is a ratio metric expressing the relationship between a sovereign's total verified asset value and its external sovereign debt. The Mineral-Adjusted Creditworthiness Assessment (MACA) is a composite framework that incorporates the SAPI as its primary domain alongside conventional debt service, revenue diversification, and institutional capacity indicators, producing an adjusted creditworthiness score suitable for adoption by rating institutions and development finance bodies. Both instruments are developed within the institutional context of the African Sovereign Development Finance Fund© (ASDFF©), the continental capital vehicle established under the African Federation Treaty Framework©, and their operational substrate is the OmniGaza® platform.

2. The Structure of African Sovereign Debt

2.1 Creditor Composition

African external sovereign debt is distributed across four primary creditor classes. Multilateral institutions, principally the International Monetary Fund and the World Bank Group, hold approximately 38% of the total stock. Bilateral creditors, of which the People's Republic of China is the dominant lender through the China Export-Import Bank, account for approximately 27%. Commercial creditors, principally Eurobond holders and syndicated loan providers, account for approximately 26%. The residual comprises smaller bilateral and non-Paris Club creditors (World Bank International Debt Statistics, 2024).

The concentration of commercial and bilateral debt is analytically significant for two reasons that interact directly with the SAPI framework. First, Eurobond debt is priced at rates reflecting perceived sovereign risk under existing methodologies that exclude asset-side information. Egypt, the continent's largest external debtor at approximately $168 billion, pays risk

premiums computed against a rating that incorporates no assessment of its in situ resource position, its agricultural land base covering the most productive stretch of the Nile Valley, or its exclusive economic zone in the Eastern Mediterranean. Kenya's 2024 Eurobond refinancing was executed at 10.375%, among the highest rates of any emerging market sovereign that year (Reuters, 2024), for a sovereign whose mineral endowment in titanium, soda ash, and fluorspar remains substantially unincorporated into any credit assessment. If Kenya's titanium and soda ash reserves were assessed at mine-site value against its external debt, the risk premium embedded in that Eurobond rate could not be analytically justified on conventional credit logic.

Second, bilateral debt, particularly Chinese policy lending, routinely includes offshore escrow mechanisms and resource-backed repayment provisions that route export revenues to foreign-administered accounts before they reach the domestic treasury (IMF Article IV Consultations, 2024). The SAPI framework does not treat this routing as irrelevant to asset valuation. A mineral reserve whose export revenues have been contractually pre-assigned to a foreign creditor should carry a legal encumbrance discount in the TVA calculation, a methodological refinement this paper proposes for the Annual Sovereign Asset Parity Report.

2.2 Legal Encumbrance Mechanisms

Four contractual instruments characterise the legal architecture of African external sovereign debt, each of which operates to assign African public revenue streams to external creditors in advance of domestic fiscal receipt. Their interaction with the SAPI framework is analytically important: each instrument functions to widen the gap between what a sovereign owns and what it can freely deploy in service of its own fiscal priorities.

Pari passu clauses require equal treatment between new and existing creditors in any future restructuring, constraining sovereign flexibility to prioritise domestic creditors or essential expenditure in distress events. *Negative pledge clauses* legally prohibit a borrowing sovereign from offering its assets as collateral to any future creditor on preferential terms, preventing refinancing against mineral or land assets even where those assets vastly exceed the existing debt stock. The practical consequence is a locked-asset paradox: the sovereign's SAPI may be extremely high, yet the very legal instruments governing its debt prevent it from deploying that asset value as leverage in the credit market. *Sovereign immunity waivers* eliminate jurisdictional protection in the governing law courts, typically London or New York, and expose sovereign assets held in those jurisdictions to attachment orders under instruments such as the UK State Immunity Act 1978, Section 1(2). The 2025 case of *African Export-Import Bank v. National Government of the Republic of South Sudan* demonstrates the operational consequence: an African state's commercial assets can be attached and its bank accounts seized through a clause it signed at the moment of borrowing and cannot subsequently retract (AFEXIM v. South Sudan, 2025). *Cross-default provisions* link unrelated debt instruments such that a technical default on one triggers acceleration of others, compounding distress events across the full obligations stack.

These instruments, taken together, effectively pre-assign African sovereign revenue streams to external creditors for the duration of the debt's term. The Republic of Congo (Brazzaville), carrying external debt equivalent to 96.8% of GDP with oil-backed repayment agreements with both the China Export-Import Bank and Glencore trading house, represents a case in which commodity export revenues are routed to creditor-administered offshore accounts before any surplus reaches Brazzaville (IMF WEO, 2025). South Sudan's oil revenues are contractually pre-assigned to service Chinese infrastructure debt, a structure validated in the 2025 AFEXIM ruling (IMF REO, 2025).

For the SAPI framework, legal encumbrance is a methodological consideration that the Annual Sovereign Asset Parity Report will address through an Encumbrance Adjustment Factor, reducing the VMR component proportionally where verified export revenues are subject to offshore escrow or resource-backed repayment provisions. This refinement ensures that the SAPI is a measure of freely deployable sovereign asset coverage, with gross asset ratios treated as a secondary figure.

2.3 The G20 Common Framework

The G20 Common Framework for Debt Treatments, established in November 2020 to coordinate restructuring for the most distressed sovereign borrowers, has resolved approximately 7% of the distressed sovereign debt stock it was convened to address in five years of operation. Zambia, the first African applicant in November 2020, reached a restructuring agreement in June 2023, nearly three years after application (Zambia Ministry of Finance, 2023). Chad and Ethiopia experienced comparable delays. The structural reasons for this underperformance include the voluntary nature of creditor participation, the absence of any binding mechanism for private creditor inclusion, and the framework's dependence on comparability-of-treatment principles that require consensus across creditor classes with incompatible interests and legal instruments.

During the period between application and resolution, debt service obligations continue to accrue. $163 billion in annual debt service payments are projected from African governments in 2024, up from $61 billion in 2010, a 167% increase in real terms over fourteen years (African Development Bank, 2024). The SAPI framework does not propose a reform of the G20 Common Framework. The ASDFF© is proposed as its replacement, a distinction that Section 6 addresses in full.

3. Deficiencies in Existing Creditworthiness Frameworks

3.1 The IMF Debt Sustainability Analysis

The IMF Debt Sustainability Analysis (DSA) is the primary instrument for assessing whether a sovereign's debt trajectory is sustainable over a medium-term horizon. For Low-Income Countries, the LIC-DSA computes present value of debt to GDP, present value of debt service to revenue, and present value of debt service to exports against threshold bands calibrated by the Country Policy and Institutional Assessment (CPIA). For Market Access Countries, the Composite Indicator Assessment applies a combination of macroeconomic, fiscal, external, and political variables to produce a composite sustainability assessment.

The DSA does not incorporate in situ resource wealth as a variable. The framework was designed for economies whose fiscal capacity derives primarily from recurrent tax revenue and export receipts, reflecting the theoretical underpinnings of Kraay and Nehru's (2006) work on external debt sustainability and the assumptions embedded in Reinhart and Rogoff's (2009) analysis of debt thresholds. Those theoretical foundations were built for economies without the specific structural characteristics of resource-rich African sovereigns: a dominant asset class that generates no recurrent revenue until extraction commences, whose value is verified in geological surveys appearing in no tax account, and whose exploitation has historically been governed by concession agreements that route revenues offshore before they reach the sovereign treasury. Applying a framework built for fiat-revenue economies to mineral-asset economies produces a structural understatement of creditworthiness that is a category limitation of the framework, distinct from a measurement error within it.

To illustrate the scale of the distortion: Zambia's copper belt holds verified copper and cobalt reserves whose combined mine-site value, at 2024 commodity prices, substantially exceeds Zambia's total external debt of approximately $17 billion (Africa Finance Corporation, 2026; World Bank, 2024). Zambia's LIC-DSA classified it as in high distress and, ultimately, in default. The DSA was technically correct: Zambia's fiat-denominated revenue flows were insufficient to service its fiat-denominated obligations on schedule. It was analytically incomplete: Zambia's real asset coverage was adequate by any rational collateralisation standard. The SAPI is the instrument that makes that completeness visible.

3.2 Rating Agency Methodologies

The three principal rating agencies each publish their sovereign rating methodologies. Common structural elements across these methodologies include measures of economic strength, institutional strength, fiscal strength, and susceptibility to event risk. None incorporate in situ mineral wealth as an explicit primary input variable (Moody's Investors Service, 2023; S&P Global Ratings, 2023). Commodity export exposure may appear incidentally in fiscal or current account assessments, but the in situ reserve value, representing the asset the sovereign holds before production commences, is absent from all three frameworks.

The consequence is visible at country level with particular clarity in the Democratic Republic of Congo. The DRC carries a B3 rating from Moody's, implying high speculative risk and material probability of default. It simultaneously holds verified mineral reserves conservatively valued at $29.5 trillion (Africa Finance Corporation, 2026), principally coltan, cobalt, copper, and lithium, the four mineral classes most critical to the global energy transition, against external debt of approximately $6.5 billion. The derived mineral-only SAPI score is 3,692. The distance between a B3 credit rating and a SAPI of 3,692 is the quantified distance between a framework that measures what a government earned last year and a framework that measures what the government owns in perpetuity. It is a structural analytical failure with a price tag attached to it.

The DRC case also provides a salutary illustration of what current rating methodologies actually incentivise. A B3-rated sovereign with $29.5 trillion in mineral reserves and $6.5 billion in external debt is rated three notches below investment grade. The rating does not tell investors that the DRC cannot pay its debts; it tells them that the DRC's institutional capacity and fiat-revenue flows make timely payment uncertain. Both assessments are legitimate. Only the second one exists in any published rating document.

3.3 The Fundamental Category Limitation

The core limitation in existing frameworks is the assessment of sovereign obligation in isolation from sovereign collateral. In corporate credit assessment, a borrower whose secured assets substantially exceed its liabilities receives a fundamentally different risk characterisation than an unsecured borrower with identical debt levels and revenue capacity. Sovereign credit assessment, as presently constructed, applies no equivalent logic to states. This asymmetry systematically disadvantages mineral-rich developing sovereigns whose wealth is embedded in subsoil assets that do not appear in the fiscal accounts.

The asymmetry is a structural feature, not a methodological oversight. It has a structural beneficiary. Credit rating agencies are incorporated in, and derive the majority of their revenue from, the capital markets of the economies whose currencies and institutions hold the largest share of African sovereign debt. A rating methodology that incorporates African mineral

reserves as a primary creditworthiness variable would reduce the risk premiums charged on African sovereign borrowing, compressing the margins earned by the commercial creditor class whose bonds these agencies rate. The absence of the SAPI from existing methodologies is analytically indefensible. Its structural causes are identifiable with precision.

4. The Sovereign Asset Parity Index (SAPI)

4.1 Definition and Rationale

The Sovereign Asset Parity Index is a ratio metric expressing the relationship between a sovereign's total verified asset value and its total external sovereign debt. It is designed to provide a single-figure representation of the asset coverage available against a sovereign's external obligations, incorporating all verifiable sovereign asset classes. The SAPI is a diagnostic and comparative instrument. It surfaces asset-side information that existing frameworks do not compute, enabling direct comparison of asset coverage positions across countries and regions, and providing the primary input into the MACA composite assessment and the ASDFF© capitalisation model.

The SAPI differs from a simple debt-to-GDP ratio in one structural respect: GDP measures annual production flows, whereas the SAPI measures accumulated asset stock. A sovereign with a modest GDP and a large mineral endowment will score low on debt-to-GDP and high on SAPI. The DRC illustrates this divergence precisely: its debt-to-GDP ratio is approximately 18%, which is low by African standards, while its SAPI of 3,692 is the highest on the continent. A complete creditworthiness assessment requires both. The MACA integrates them.

4.2 Formula

The SAPI for a given sovereign or aggregated territory is:

$$\mathbf{SAPI}(i) = \mathbf{TVA}(i) \,/\, \mathbf{ESD}(i)$$

TVA(*i*) (Total Verified Asset Value) is the sum of four sovereign asset classes:

VMR(*i*): In situ mineral reserve value, calculated at the 90-day rolling average commodity price for each commodity class applied to proven and probable reserve quantities as independently certified. Primary data source: Africa Finance Corporation Compendium of Africa's Strategic Minerals (2026), cross-referenced against USGS national mineral assessments and S&P Global Market Intelligence reserve databases. Where only inferred or historical estimates are available, a certification discount of 40% is applied to the VMR component pending independent geological assessment. This discount is conservative by design: the SAPI is intended to produce defensible floor estimates.

ALA(*i*): Agricultural land asset value, expressed as the net present value of productive capacity at current crop yield rates applied to land area under formal or customary tenure, discounted at the sovereign's weighted average cost of capital. Methodology adapted from World Bank Wealth Accounting (World Bank, 2021). The ALA component captures only the productive capacity of the agricultural land base and does not incorporate sub-surface rights, whose treatment under African mining law has been explored in the companion article, *The Land Question* (Amayo, 2026c). The ALA and the VMR are legally separable in most African jurisdictions precisely because colonial-era mining codes severed surface and subsurface title; where both are consolidated under sovereign or community ownership, the combined TVA component will be proportionally larger.

EEZ(*i*): Exclusive Economic Zone asset value, incorporating documented hydrocarbon discoveries under production-sharing agreement, independently certified fisheries stocks at sustainable yield rates, and registered seabed mineral concessions. Data drawn from FAO fisheries assessments and country-level hydrocarbon surveys. The EEZ component is, for most African coastal sovereigns, the single most undervalued asset class in current credit assessment: the combined exclusive economic zones of the continent's 38 coastal and island states encompass approximately 6.5 million square kilometres of ocean, carrying documented fishery losses to illegal, unreported, and unregulated foreign fleets of $10 to $23 billion annually (High Level Panel for a Sustainable Ocean Economy, 2023).

FWR(*i*): Freshwater resource value, expressed as the replacement cost of equivalent water storage and distribution infrastructure capacity, following the infrastructure replacement cost methodology of the World Resources Institute. The Congo Basin alone holds approximately 13% of the world's total freshwater reserves (WRI, 2022), an asset class whose global scarcity value will increase materially as climate change reduces freshwater availability in the world's most densely populated regions.

ESD(*i*): Total External Sovereign Debt is total external sovereign debt as reported to the World Bank International Debt Statistics system. No adjustments are made to the denominator. The full external debt stock is used to ensure the SAPI is conservative and reproducible.

4.3 Methodological Notes

The SAPI is a static snapshot metric calculated at a defined valuation date. It does not model extraction timelines, commodity price trajectories beyond the 90-day rolling average, or political risk premiums. These dynamic variables are properly the domain of the MACA composite. The SAPI's purpose is to establish, at a defined moment, what a sovereign owns relative to what it owes to external creditors, using independently verifiable data sources.

The 90-day rolling average for commodity pricing reduces sensitivity to short-term volatility while remaining sufficiently current to be analytically meaningful. The author recommends a 12-month rolling average for formal institutional adoption by credit rating agencies or multilateral bodies, as this produces more conservative and cycle-resistant estimates. The 90-day average is retained in this paper for proximity to current market valuations.

The VMR component constitutes the dominant share of TVA for most African states. For island and coastal sovereigns with large EEZ positions relative to land area, the EEZ component carries proportionally greater weight. For agricultural economies with limited mineral endowments, the ALA component becomes primary. The SAPI framework accommodates these structural differences through its multi-component TVA definition without privileging any single asset class as the universal determinant of sovereign creditworthiness.

A note on reproducibility: every data source used to compute the SAPI scores in this paper is publicly available. The AFC Compendium is accessible to researchers. The World Bank International Debt Statistics database is openly published. The USGS Mineral Commodity Summaries are freely downloadable. The SAPI formula is defined above. Any institution or researcher can reproduce these scores, contest these findings, and propose improvements to the methodology. That reproducibility is the signal that this framework has entered the policy literature as a replicable contribution, available to any institution that chooses to build on it.

4.4 Continental Application

Applying the SAPI to Africa's continental position:

Total Verified Asset Value (TVA, Africa)

Asset Class	Value (USD)	Source
Mineral reserves (VMR)	$29.5 trillion	Africa Finance Corporation, 2026
Agricultural land (ALA)	~$5.1 trillion	World Bank Wealth Accounting, 2021
Exclusive Economic Zones (EEZ)	~$2.8 trillion	FAO / author's estimate
Freshwater resources (FWR)	~$1.4 trillion	WRI methodology / author's estimate
TVA (Africa)	**~$38.8 trillion**	

Total External Sovereign Debt (ESD, Africa): $1.152 trillion (World Bank, 2024)

SAPI(Africa) = $38.8 trillion / $1.152 trillion = 33.7

The mineral-only collateralisation ratio is $29.5 trillion / $1.152 trillion = **25.6**, cited as the primary figure in the companion article *The Debt Cartography* (Amayo, 2026b). The SAPI of 33.7 is the more complete metric, incorporating all four sovereign asset classes in the numerator. Both figures are conservative, for the same reason the mine-site valuation methodology is conservative: they exclude processing value, exclude non-certified inferred reserves, and make no allowance for the increase in commodity prices that the global energy transition is driving for the precise mineral classes in which the continent is most endowed.

For context: the United States national debt stood at approximately $36.2 trillion as of mid-2025, against federal public assets of approximately $4.2 trillion, producing a federal SAPI of 0.12 (US Treasury, 2025; US GAO Federal Balance Sheet, 2024). The same nation that supervises African sovereign borrowing capacity through its weighted voting share in IMF governance holds a SAPI of 0.12 against the continent's SAPI of 33.7. The inverse relationship between these two numbers and the institutional architecture that has been constructed on top of it is one of the more precisely documented anomalies in the history of international finance.

4.5 Country-Level Results

The SAPI scores presented here are calculated primarily from mineral reserve valuations and external debt figures, with the three non-mineral asset components incorporated at continental aggregate level at this stage of the framework's development. Full multi-asset, country-level SAPI scores will be published in the first Annual Sovereign Asset Parity Report, scheduled for Q1 2027.

Country	External Debt (USD)	Primary Mineral Asset	SAPI
DRC	~$6.5bn	Coltan, cobalt, copper, lithium	3,692

South Africa	~$55bn	Platinum group metals, gold, chrome	45.5
Ethiopia	~$28bn	Potash, gold, tantalum	17.9
Zambia	~$17bn	Copper, cobalt	14.7
Nigeria	~$43bn	Hydrocarbons, bitumen	11.6
Morocco	~$60bn	Phosphate (world's largest reserves), silver	8.3
Ghana	~$30bn	Gold, bauxite, manganese	5.0
Angola	~$69bn	Hydrocarbons, diamonds	2.9
Egypt	~$168bn	Hydrocarbons, phosphate	2.1
Kenya	~$37bn	Soda ash, titanium, fluorspar	1.4
Africa (continental, all classes)	**$1.152 trillion**	**Full TVA**	**33.7**

The distribution is analytically instructive in ways that the raw numbers alone do not convey. Kenya's SAPI of 1.4 reflects a position in which current external debt levels closely approach known mineral asset values and in which significant unverified and undeveloped mineral potential exists; the single most urgent institutional priority for Kenya's credit position under the MACA framework is accelerated mineral cadaster completion and domestic processing investment, with fiscal adjustment as a secondary consideration. Egypt's SAPI of 2.1, for the continent's largest external debtor, reflects the thinnest verified coverage ratio on the continent among fully assessed sovereigns; at $168 billion in external debt and growing, Egypt represents the primary case study for SAPI-adjusted debt conversion under the ASDFF© facility architecture. Countries with SAPI scores below 2.0 represent the priority cohort for ASDFF© debt conversion facilities under the replacement architecture described in Section 6.

The DRC score of 3,692 is the framework's most important single finding. The most financially distressed sovereign on the continent by every conventional metric simultaneously holds the highest overcollateralisation ratio against its external obligations of any state in the contemporary global financial system. The distance between a B3 credit rating and a SAPI of 3,692 is the distance between what the current analytical framework produces and what the asset position warrants. This paper proposes that this distance has a name, a formula, and a remedy.

5. The Mineral-Adjusted Creditworthiness Assessment (MACA)

5.1 Rationale

The SAPI establishes the asset-to-debt ratio for a given sovereign or region. It does not, in itself, produce a composite credit assessment; a high SAPI alongside an absent state, a captured extraction sector, and a single-commodity export dependency is a continent's balance sheet, not its credit profile. The Mineral-Adjusted Creditworthiness Assessment incorporates the SAPI as its primary domain alongside three conventional creditworthiness variables, producing a composite score on a standardised scale that rating institutions and development finance bodies can adopt alongside or in place of existing sovereign rating methodologies for African states.

The MACA's weight allocation deliberately inverts the implicit priorities of existing frameworks. Where current methodologies treat institutional indicators and macroeconomic stability as primary signals and say nothing at all about assets, the MACA treats the asset position as primary and treats institutional and macroeconomic variables as the indicators of how effectively the asset base is being converted into fiscal capacity. This is the correct sequencing for resource-rich sovereigns. Institution quality matters enormously, but it matters as a predictor of future DSCR improvement, not as a substitute for the asset coverage that the SAPI already measures.

The MACA is designed to be implementable with data currently available from the Africa Finance Corporation, the World Bank, the United States Geological Survey, national mineral cadasters, and the IMF's country consultation reports. It requires a methodological decision to include asset-side information in sovereign creditworthiness assessment, which is the central institutional proposition this paper advances.

5.2 The MACA Formula

Each MACA component is normalised to a 0-100 scale before aggregation, producing a composite score on a 0-100 scale where higher scores indicate stronger creditworthiness:

$$\mathbf{MACA}(i) = \alpha \cdot \mathbf{SAPI}_{\mathbf{norm}}(i) + \beta \cdot \mathbf{DSCR}_{\mathbf{norm}}(i) + \gamma \cdot \mathbf{RDI}_{\mathbf{norm}}(i) + \delta \cdot \mathbf{ICI}_{\mathbf{norm}}(i)$$

where $\alpha + \beta + \gamma + \delta = 1.0$

α = 0.40: $SAPI_{norm}(i)$ carries the highest weight because, for resource-rich sovereigns, the in situ asset position represents the primary long-run source of fiscal capacity and debt coverage. Normalisation uses a log-linear function: $SAPI_{norm}(i)$ = min(100, (log(SAPI(*i*)) / log(3,692)) × 100), where 3,692 is the current maximum observed SAPI. This preserves ordinality while preventing extreme outlier scores from dominating the composite.

β = 0.25: $DSCR_{norm}(i)$ is the ratio of the primary fiscal surplus plus verified commodity royalty receipts to total scheduled debt service obligations in the assessment year. The DSCR replaces the conventional debt-to-GDP ratio as the primary fiscal metric on the grounds that GDP is an incomplete proxy of sovereign fiscal capacity for mineral-rich states where extraction occurs predominantly under foreign concession agreements whose revenues do not fully appear in domestic national accounts.

γ = 0.20: $RDI_{norm}(i)$ is a Herfindahl-Hirschman Index-derived measure of revenue concentration, calculated across government revenue streams including taxation, mineral royalties, non-tax revenue, and grants. This component penalises commodity monocultures operating under foreign concession terms while rewarding sovereigns that have developed diversified fiscal bases.

δ = 0.15: $ICI_{norm}(i)$ is a composite of the World Bank Country Policy and Institutional Assessment, the Mo Ibrahim Foundation Index of African Governance, and the Transparency International Corruption Perceptions Index, averaged and normalised to 0-100. The ICI carries the lowest weight in deliberate recognition that institutional scores are themselves partly a function of historical resource extraction dynamics, external financing conditions, and colonial administrative legacies. An analytical framework that penalised, through overweighted institutional scores, the very states whose institutional capacity was most severely compromised by the extraction architecture documented in this paper would reproduce the category error it was designed to correct.

5.3 Worked Application: The Democratic Republic of Congo

Applying the MACA to the DRC at current data illustrates both the framework's diagnostic utility and the gap it is designed to close.

Component	Raw Value	Normalised Score	Weighted Score
$SAPI_{norm}$	3,692	100.0	40.0 (α = 0.40)
$DSCR_{norm}$	~0.4	20.0	5.0 (β = 0.25)
RDI_{norm}	High concentration	15.0	3.0 (γ = 0.20)
ICI_{norm}	B3-equivalent	18.0	2.7 (δ = 0.15)
MACA(DRC)			**50.7**

A MACA score of 50.7 places the DRC materially above the implied risk level of a B3 Moody's rating, which maps to approximately 25-30 on a comparable normalised scale. The MACA reflects the DRC's dominant asset position while incorporating its institutional and debt service constraints with precision. The critical difference from the conventional rating is that the DRC's asset coverage is registered in the primary model.

The MACA also identifies the institutional pathway to improvement with a specificity absent from conventional ratings. Increasing the DRC's DSCR from 0.4 to 1.0, achievable through a combination of majority equity participation in Sicomines and comparable arrangements, a domestic cobalt processing mandate that captures value-added revenue domestically, and royalty renegotiation on existing concession agreements, would increase the DRC's MACA score by approximately 12 points without any change in its debt stock or its underlying mineral endowment. A MACA score of 62.7 would, on the normalised scale proposed, correspond to a BB+ equivalent, placing the DRC on the boundary of investment grade and within a category that would halve the risk premium on any future sovereign borrowing.

This is the MACA's institutional value. A conventional rating tells a sovereign what its score is and provides limited guidance on how to improve it through structural means. The MACA tells a sovereign exactly which component of its creditworthiness is depressing its composite score, what the score improvement would be from specific institutional interventions, and what the financing cost reduction would follow. It converts a rating into a roadmap.

5.4 The MACA and the Botswana Benchmark

Applying the MACA framework retrospectively to Botswana from 1975, the year the Debswana 50% equity structure was formalised, demonstrates the relationship between institutional ownership choices and MACA trajectories over time. The Debswana decision converted a high SAPI, Botswana's diamond reserves vastly exceeded its debt stock even in 1975, from a static balance sheet figure into a recurring DSCR improvement. The result, over five decades, is Africa's strongest sub-Saharan credit profile and a MACA score that, under this framework, would consistently have signalled investment-grade

creditworthiness from the point at which the equity structure was formalised. Botswana did not become creditworthy through fiscal austerity. It became creditworthy through ownership. The MACA is the analytical instrument that makes the pathway from ownership to creditworthiness legible for every other state on the continent.

6. The African Sovereign Development Finance Fund© as the Replacement Architecture

6.1 Institutional Architecture

The African Sovereign Development Finance Fund© (ASDFF©) is the continental capital vehicle established under the African Federation Treaty Framework© as the co-equal capital institution of the Sovereign Operating System, alongside the Pan African Court℠, the Central Bank of Africa℠, and the United African Defence Force℠ (Amayo, 2026a). Its constitutional mandate is to provide development finance to African member states and sub-sovereign entities on terms calibrated to the actual asset position of the continent, a position this paper has now quantified precisely.

The ASDFF© is described here as a replacement, and the choice of that word over reform is deliberate. A reform of the existing architecture assumes that the architecture's fundamental purpose is sound and its execution flawed. The forensic analysis in the companion article, *The Debt Cartography* (Amayo, 2026b), establishes the opposite: the architecture's purpose is working as designed, and its execution has been precise. The four contractual instruments described in Section 2.2 of this paper did not accumulate in African sovereign debt agreements through oversight. They were designed, negotiated, and insisted upon by creditors who understood exactly what they secured. Reforming an extractive instrument produces a slightly less extractive instrument. The ASDFF© is constituted as a replacement architecture, for reasons the evidence in this paper has made precise.

6.2 SAPI as the Capitalisation Basis

The continental SAPI of 33.7 provides the analytical foundation for the ASDFF©'s capitalisation model. The Fund's collateral base is the continental TVA of $38.8 trillion. A capital facility backed by 1% of this TVA yields a theoretical initial capitalisation of $388 billion, exceeding total annual African foreign direct investment flows and more than doubling the current annual African Development Bank lending programme. A facility backed by 2% of the TVA yields $776 billion, approaching the scale of the World Bank's total outstanding loan portfolio.

These figures are ratios, not projections. The mineral wealth is in the ground. The question is whether the institutional architecture exists to collateralise it on Africa's own terms, and the answer this paper provides is that the SAPI is the metric that makes that collateralisation legible, the MACA is the instrument that prices it, and the ASDFF© is the vehicle that deploys it.

The MACA provides the per-member-state credit scoring instrument through which individual borrowing capacity within the ASDFF© is determined. Member states with high SAPI but constrained DSCR and ICI scores access capacity-building and structural reform facilities first, in advance of balance of payments or project finance facilities. This sequencing ensures that the institutional gap between what a member state owns and what it is currently capturing from that ownership is addressed before additional obligations are created. Member states with SAPI scores below 2.0 access priority debt conversion facilities through which ASDFF© instruments replace commercial and bilateral obligations, converting encumbered debt into constitutionally governed development finance on terms reflecting the continent's actual collateral position.

6.3 The Sovereign Operating System

The ASDFF© operates within a four-pillar constitutional architecture whose components are co-equal under the AFTF©:

The **Pan African Court**℠ provides the judicial authority and constitutional oversight under which all ASDFF© instruments are governed. Unlike the SADC Tribunal, whose 2008 ruling and subsequent 2010 dissolution demonstrated the consequences of regional judicial authority that depends on member state consent to remain operative, the Pan African Court℠ is constituted under binding treaty ratification within the AFTF©, so that the jurisdiction member states accept at treaty signature cannot subsequently be withdrawn by the same government it may one day rule against.

The **Central Bank of Africa**℠ provides the monetary clearing infrastructure through which ASDFF© instruments are settled, the Ndege Money© currency system through which continental transactions are denominated, and the OmniGaza® substrate through which the sovereign registry is maintained.

The **United African Defence Force**℠ provides the security architecture within which the continental economic system operates, specifically including the Unified African Maritime Border mandate that governs the exclusive economic zones whose asset value the EEZ component of the SAPI is designed to capture.

The **African Sovereign Development Finance Fund©** is the capital pillar, capitalised against the continental TVA as measured by the SAPI, and constitutionally accountable to the Pan African Court℠.

These four pillars are co-equal. The absence of any one of them reduces the others to instruments without an operating context. A central bank without judicial oversight is a printing press. A development finance fund without a security perimeter is an invitation. A court without enforcement powers is an advisory body. The AFTF© constitutes all four simultaneously, which is why it is structured as a treaty, with the constitutional durability a programme cannot provide.

6.4 OmniGaza® as the Operational Substrate

OmniGaza® is the sovereign registry and continental intelligence platform through which SAPI scores are maintained, verified, and updated (Amayo, 2025b). Its continental intelligence layer integrates verified sovereign identity, mineral cadaster data drawn from national mining registries, royalty payment flows, and active concession agreement terms into a single sovereign ledger on which all ASDFF© transactions are recorded and governed. The verified identity infrastructure of OmniGaza® underpins the ICI dimension of the MACA, providing real-time evidentiary records of contract terms, royalty payment histories, sovereign equity positions, and active immunity-waiver and negative pledge provisions that are otherwise dispersed across incompatible national and international legal registers.

The integration of the SAPI analytical framework, the MACA composite assessment instrument, and the OmniGaza® operational infrastructure constitutes one cohesive institutional ecosystem: the AFTF© provides the constitutional authority, the SAPI and MACA provide the analytical instruments, the ASDFF© provides the capital vehicle, and OmniGaza® provides the transactional and evidentiary substrate on which the entire architecture operates.

7. The African Sovereign Debt Cartography

The table below reproduces in full the African Sovereign Debt Cartography published in *The Debt Cartography* (Amayo, 2026b) and accessible on the thendegegroup.com platform. It is included here as the primary evidentiary table on which the SAPI country scores rest, and to ensure that the analytical framework introduced in this paper is immediately grounded in the specific debt positions, creditor classes, and contextual notes for every AU member territory.

SAPI scores for the ten countries in Appendix A are derived from mineral reserve valuations against external debt figures. For the remaining 45 territories, SAPI scores are contextually described in the Key Note column using the categories High, Very High, Moderate, Low, and Critical, consistent with the SAPI range brackets defined in Appendix B.

#	Country	External Debt (USD)	Primary Creditor Class	Debt/GDP	Mineral SAPI	Key Note
1	Egypt	~$168 billion	IMF and Gulf States	~90%	2.1	Continent's largest external debtor; $3 billion IMF Stand-By 2022; hydrocarbon and phosphate asset base requires full cadaster completion to reflect genuine SAPI.
2	Angola	~$69 billion	China Exim Bank	~75%	2.9	Oil-backed offshore escrow since 2004; largest Chinese credit recipient on continent; escrow encumbrance reduces freely deployable TVA below gross figure.
3	Morocco	~$60 billion	Eurobond and Paris Club	~38%	8.3	World's largest phosphate reserves; most investment-grade North African sovereign; SAPI would increase materially on full EEZ and agricultural land valuation.
4	Algeria	~$57 billion	Domestic and multilateral	54.1%	High	Africa's largest natural gas exporter; low external debt but hydrocarbon dependency creates fiscal vulnerability as global energy transitions. Source: IMF WEO 2025.
5	Sudan	~$56 billion	Paris Club and non-Paris bilateral	272%	Critical / Conflict	Highest debt-to-GDP ratio in Africa; active civil conflict since April 2023; gold and agricultural land base constitutes latent sovereign asset underweighted in all current assessments. Source: Trading Economics / IMF 2024.
6	South Africa	~$55 billion external	Eurobond markets	~14% external	45.5	Primarily domestic rand-denominated debt; platinum group metal endowment among the most valuable on the planet, massively underweighted in fiat credit metrics.
7	Nigeria	~$43 billion	World Bank and Eurobond	~23%	11.6	Large domestic debt component; hydrocarbon reserve base and demographic scale position it as a natural MACA Tier 1 sovereign on asset-adjusted metrics.
8	Tunisia	~$42 billion	IMF and European creditors	82.9%	High	IMF programme stalled 2023; domestic financing gap widening; phosphate export revenues systematically undervalued in creditworthiness assessments. Source: IMF WEO 2025.
9	Kenya	~$37 billion	Eurobond and China	~67%	1.4	2024 Eurobond refinanced at 10.375%; SGR legacy debt; Gen Z protests over Finance Bill conditionalities; accelerated mineral cadaster completion is the single highest-return institutional investment Kenya can make.
10	Cote d'Ivoire	~$36 billion	Eurobond and multilateral	59.5%	High	Largest cocoa producer globally; cocoa export revenues servicing Eurobonds issued at rates reflecting sovereign risk without accounting for commodity position. Source: IMF WEO 2025.
11	Ghana	~$30 billion	Eurobond	~85%	5.0	Default December 2022; domestic bondholders absorbed larger haircuts than foreign holders; cocoa sector restricted under IMF conditionality.
12	Senegal	~$28 billion	Eurobond and multilateral	111%	Very High	Debt-to-GDP exceeds 100% as offshore oil and gas production begins; the instruments enabling extraction were signed before sovereign revenue materialised. Source: IMF WEO 2025.
13	Ethiopia	~$28 billion	World Bank and China	~30%	17.9	Common Framework applicant since February 2021; Tigray conflict compounded fiscal consolidation demands; potash and gold base positions it well on a SAPI-adjusted assessment.
14	Tanzania	~$22 billion	World Bank and China	~40%	11.4	Historically conservative borrower; gold and gas reserves strengthening; SAPI will increase as offshore gas development progresses under Tanzanian equity terms.
15	Uganda	~$22 billion	China and multilateral	54.2%	High	Oil production commencing in the Albertine Graben; EACOP pipeline financing assigns offtake rights to foreign lenders as collateral, encumbering the primary VMR asset. Source: IMF WEO 2025.
16	Zimbabwe	~$18 billion	Bilateral arrears	87.0%	Critical /	In arrears to Paris Club and multilateral creditors; platinum, gold, and lithium

			(US, EU)		Arrears	endowment absent from current creditworthiness methodology; SADC Tribunal dissolution precedent originated here. Source: IMF WEO 2025.
17	Zambia	~$17 billion	Eurobond and China	~110%	14.7	First post-COVID African default November 2020; four-year restructuring; copper belt mineral value eclipses debt stock; SAPI of 14.7 made the default analytically anomalous from the outset.
18	Cameroon	~$14 billion	China Exim Bank and multilateral	40.4%	Moderate	Resource-backed lending concentrated in infrastructure; timber and cocoa value chains partially captured domestically. Source: IMF REO 2025.
19	Mozambique	~$12 billion	Eurobond and China	~107%	8.3	Hidden debt scandal 2016 triggered IMF suspension; offshore gas reserves under development will substantially alter the SAPI once cadaster certification is completed.
20	Rep. of the Congo (Brazzaville)	~$11 billion	China and Glencore	96.8%	Very High	Oil-backed debt to China and Glencore trading house; commodity-linked repayment clauses route revenue to creditors before domestic treasury receipt. Source: IMF WEO 2025.
21	Mauritius	~$10 billion	Domestic and multilateral	86.5%	High	Financial services centre; COVID-era stimulus elevated debt; ocean economy and EEZ assets absent from sovereign rating frameworks. Source: IMF WEO 2025.
22	Rwanda	~$9 billion	Multilateral and bilateral	67.2%	High	Fastest-growing debt profile in East Africa; coltan and tin revenues captured primarily by foreign concessionaires. Source: IMF WEO 2025.
23	Namibia	~$9 billion	Domestic and multilateral	70.2%	High	Uranium and diamond exporter; Orange Basin offshore oil development underway; credit rating lags behind emerging asset base. Source: IMF WEO 2025.
24	Gabon	~$8 billion	Eurobond and multilateral	78.9%	High	Manganese and oil exporter; military transition government since 2023; Eurobond holders secured preferential treatment in 2024 restructuring. Source: IMF WEO 2025.
25	Benin	~$7 billion	Eurobond and multilateral	52.5%	Moderate	Landmark sustainability-linked Eurobond issued 2022; cotton and cashew exports with value addition occurring offshore. Source: IMF WEO 2025.
26	DRC	~$6.5 billion	World Bank	~18%	3,692	Rated B3 by Moody's. Holds mineral reserves valued at $29.5 trillion (Africa Finance Corporation, 2026). The SAPI of 3,692 is accurate and is the defining data point in the African sovereign finance literature.
27	Mali	~$6 billion	Multilateral (post-suspension)	51.7%	High	Western creditor engagement suspended following 2021 coup; gold production at 70 tonnes annually, revenues captured largely upstream. Source: IMF REO FRED 2024.
28	Burkina Faso	~$5 billion	WAEMU bonds and multilateral	53.1%	High	Significant gold producer; WAEMU monetary framework constrains independent sovereign debt policy; IMF engagement suspended post-2022. Source: IMF WEO 2025.
29	Niger	~$5 billion	WAEMU and multilateral	48.1%	High	Uranium producer supplying European nuclear industry; ore priced at below-market rates under historic Franco-Nigerien concession terms. Source: IMF WEO 2025.
30	Madagascar	~$5 billion	Multilateral	48.7%	Moderate	Nickel, cobalt, chromite and vanilla exporter; mineral value chain fully offshore; Rio Tinto QMM exports unprocessed ilmenite. Source: IMF WEO 2025.
31	Mauritania	~$5 billion	China and multilateral	46.2%	Moderate	Iron ore and fishing economy; GTA offshore gas project (2024) under production-sharing agreements weighted toward foreign operators. Source: IMF WEO 2025.
32	Togo	~$5 billion	Eurobond and WAEMU	69.5%	High	Phosphate reserves undervalued in credit assessment; WAEMU membership limits monetary flexibility. Source: IMF WEO 2025.
33	Guinea	~$4 billion	China and multilateral	48.1%	High	World's largest bauxite reserves; bauxite exported as unprocessed ore at a fraction of refined aluminium value. Source: IMF WEO 2025.
34	South Sudan	~$4 billion	China Exim and bilateral	66.0%	High / Conflict	Oil revenues pre-assigned to service Chinese infrastructure debt; 2025 AFEXIM ruling demonstrated sovereign asset attachment under immunity-waiver clauses. Source: IMF REO FRED 2025.
35	Malawi	~$4 billion	Multilateral	87.7%	Very High / Distress	HIPC-eligible; kwacha depreciation accelerated debt servicing costs; tobacco revenues priced at commodity rates by foreign buyers. Source: IMF WEO 2025.
36	Botswana	~$3 billion	Domestic	24.9%	Low	Strongest sovereign balance sheet in sub-Saharan Africa; Debswana 50% equity model is the empirical proof of concept for the SAPI framework. Source: IMF WEO 2025.
37	Sierra Leone	~$3 billion	Multilateral	45.2%	Moderate	Iron ore and rutile exporter; HIPC completion 2006; mineral revenues captured primarily by foreign concessionaires under colonial-era concession terms. Source: IMF WEO 2025.
38	Chad	~$3 billion	Glencore and China Exim	30.4%	Moderate	Oil-backed debt to Glencore; 2021 restructuring required extending commodity-linked repayment terms. Source: IMF WEO 2025.
39	Cabo Verde	~$2.8 billion	Multilateral and bilateral	109%	Very High	Tourism-dependent island economy; debt exceeds GDP; wind, solar, and EEZ assets constitute the primary sovereign asset not yet reflected in credit metrics. Source: IMF WEO 2025.
40	Equatorial Guinea	~$2.5 billion	Commercial and bilateral	40.6%	Moderate	Oil production declining; opaque borrowing structure historically shielded by high oil revenues. Source: IMF WEO 2025.
41	Djibouti	~$2.2 billion	China Exim Bank	30.5%	Moderate	Strategic port economy; Addis-Djibouti railway financed through Chinese debt with port revenues partially collateralised. Source: IMF WEO 2025.
42	Guinea-Bissau	~$2 billion	WAEMU and multilateral	80.5%	Very High	Cashew nut monoculture; nine coups or coup attempts since independence; WAEMU membership prevents independent monetary response. Source: IMF WEO 2025.
43	Liberia	~$1.8 billion	Multilateral	54.1%	High	Iron ore, rubber and timber exporter; Firestone rubber concession, a Bridgestone subsidiary, operates on 99-year terms signed in 1926. Source: IMF WEO 2025.
44	Lesotho	~$1.4 billion	Multilateral	60.0%	High	Diamond and water export economy; Lesotho Highlands Water Project revenue-shared with South Africa under 1986 treaty terms. Source: IMF WEO 2025.
45	Central African Republic	~$1.3 billion	Multilateral and Russia (bilateral)	61.8%	High / Conflict	Diamond and gold producer; Russian Wagner successor forces operating in exchange for mining concession access; mineral revenue largely exits formal state accounting. Source: IMF WEO 2025.
46	Somalia	~$1.2 billion	Paris Club (post-HIPC relief)	8.9%	Moderate (improving)	HIPC completion 2023; Paris Club claims cancelled March 2024; EEZ fishing rights exploited by foreign fleets outside fiscal accounting. Source: IMF Staff Country Report 2025.
47	Seychelles	~$1.1 billion	Multilateral and Eurobond	53.0%	Moderate	Africa's first sovereign blue bond issued 2018; ocean economy and EEZ assets absent from sovereign credit frameworks. Source: IMF WEO 2025.
48	Gambia	~$1.1 billion	Multilateral	73.9%	High	HIPC-eligible; structurally dependent on remittances; groundnut export revenues

						priced at commodity rates. Source: IMF WEO 2025.
49	Sao Tome and Principe	~$0.5 billion	Multilateral	51.4%	Moderate	Offshore oil prospects in the Gulf of Guinea; cocoa and tourism base insufficient to service debt without concessional terms. Source: IMF REO FRED 2025.
50	Comoros	~$0.4 billion	Multilateral	28.4%	Moderate	Vanilla, cloves and ylang-ylang exporter; EEZ fishing rights sold cheaply to EU fleets; sovereign asset base unquantified. Source: IMF WEO 2025.
51	Eswatini	~$0.8 billion	Domestic and multilateral	19.3%	Low-Moderate	Sugar and textile economy; fiscal position constrained by SACU revenue allocation formula. Source: IMF WEO 2025.
52	Burundi	~$0.8 billion	Multilateral	13.1%	Low (fragile)	Low nominal debt masks extreme fiscal fragility; nickel, cobalt, and rare earth deposits largely unexploited. Source: IMF WEO 2025.
53	Eritrea	Data limited	State bilateral	164%	Critical	Highest formally reported debt-to-GDP in Africa excluding Sudan; isolated from IMF surveillance; copper and zinc revenues not independently audited. Source: IMF / Trading Economics 2024.
54	Libya	Data limited	State-owned oil revenues	N/A (conflict)	Indeterminate	IMF data severely limited by ongoing civil conflict; sovereign wealth fund assets (LIA) held offshore under international freeze orders since 2011; oil reserves are the ninth largest globally. Source: IMF, limited data.
55	Western Sahara	N/A	N/A (non-sovereign)	N/A	N/A	Phosphate deposits among the world's largest, mined by Morocco under contested legal authority. The AFTF© recognises Sahrawi sovereignty claims through AU membership (SADR is a founding AU member).
Σ Continental Total (quantified)		**~$1.152 trillion**	**Multiple**	**Avg. ~58%**	**SAPI: 33.7**	**Total African external sovereign liabilities at end-2023, against $29.5 trillion in verified mineral wealth. Sources: World Bank, 2024; Africa Finance Corporation, 2026.**

Table 1. African Sovereign Debt Cartography: All 55 AU Member Territories. External debt, primary creditor class, debt-to-GDP ratio, and Sovereign Asset Parity Index (SAPI) calculated on verified mineral reserves. Sources: World Bank International Debt Statistics, 2024; IMF Article IV Consultations, 2023–2024; S&P Global, 2024; Africa Finance Corporation, 2026; Trading Economics, 2024–2025. SAPI scores are the author's calculation. They do not constitute investment advice.

8. Conclusion

The Sovereign Asset Parity Index and the Mineral-Adjusted Creditworthiness Assessment address a documented and quantifiable gap in sovereign credit methodology. The gap is not a matter of contested empirical values. The mineral reserve data is independently certified. The debt stock is publicly reported. The ratio between them is arithmetic. The only reason it does not appear in existing creditworthiness assessments is that the frameworks used to produce those assessments were not designed to include it, and a reasonable case exists, documented in the structure of those frameworks and the constituency of those who built them, that this omission has not been accidental.

The continental SAPI of 33.7 is a conservative estimate. It will increase as asset inventories are completed, as EEZ hydrocarbon positions are formally documented, as agricultural land values are systematically assessed, and as freshwater and biodiversity asset classes are incorporated into the TVA definition. The DRC's SAPI of 3,692 demonstrates that, in the most extreme cases, the distance between what existing ratings imply and what the asset position warrants is a structural analytical failure with measurable consequences: $163 billion per year in debt service payments by 1.4 billion people's governments, at risk premiums that cannot be analytically justified against the asset collateral those governments hold.

The United States holds a federal SAPI of 0.12. It allocates 26.6% of IMF voting shares to itself and the G7. The African continent holds a SAPI of 33.7. It commands 8.4% of IMF voting shares across 54 member states. The inverse relationship between asset coverage and institutional voice in the governing architecture of global sovereign finance is the context in which the SAPI and MACA are proposed, and the context in which the ASDFF© is constituted as a replacement architecture, for reasons the evidence in this paper has made precise.

The SAPI and MACA are offered to the ASDFF© as the primary instruments for continental credit assessment and facility pricing, to the African Development Bank's credit risk functions as inputs for revising sovereign assessment methodologies for resource-rich member states, to the IMF's Debt Sustainability Analysis review process as a documented case for incorporating verified sovereign asset value into the primary analytical model, and to the broader academic and policy community as a replicable, reproducible, falsifiable analytical contribution.

The African continent carries $1.152 trillion in external debt. It holds $38.8 trillion in verified sovereign assets. The arithmetic required to reframe African sovereign finance has always been simple. The continent is 33.7 times overcollateralised for its own external obligations. Thirty-three times over, Africa is owed the benefit of the doubt it has never been extended. The analytical instruments to say so are now built, published, and available to any institution with the institutional will to use them.

The institutions required to act on it are now built.

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Appendix A: SAPI Country Scores (Mineral-Primary, 10 Fully Assessed States)

Scores calculated from mineral reserve valuations (VMR) against total external sovereign debt (ESD). Non-mineral TVA components are incorporated at the continental aggregate level in this edition. Full multi-asset scores for all 54 states will be published in the Annual Sovereign Asset Parity Report, Q1 2027. Sources: Africa Finance Corporation (2026); IMF Article IV Consultations (2024); World Bank International Debt Statistics (2024).

Rank	Country	Ext. Debt (USD)	Primary Mineral Class	SAPI
1	DRC	~$6.5bn	Coltan, cobalt, copper, lithium	3,692
2	South Africa	~$55bn	Platinum group metals, gold, chrome	45.5
3	Ethiopia	~$28bn	Potash, gold, tantalum	17.9
4	Zambia	~$17bn	Copper, cobalt	14.7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

5	Nigeria	~$43bn	Hydrocarbons, bitumen	11.6
6	Morocco	~$60bn	Phosphate, silver	8.3
7	Ghana	~$30bn	Gold, bauxite, manganese	5.0
8	Angola	~$69bn	Hydrocarbons, diamonds	2.9
9	Egypt	~$168bn	Hydrocarbons, phosphate	2.1
10	Kenya	~$37bn	Soda ash, titanium, fluorspar	1.4
—	**Africa (continental, all TVA classes)**	**$1.152 trillion**	**Full TVA**	**33.7**

Full 54-country table with per-country asset class breakdown and certification confidence ratings to be published in the Annual Sovereign Asset Parity Report, Q1 2027. Available from the Strategic Executive Office, Africa's Sovereign Development Trust®.

Appendix B: Glossary of Defined Terms

SAPI (Sovereign Asset Parity Index)

The ratio of Total Verified Asset Value (TVA) to Total External Sovereign Debt (ESD) for a given sovereign or territory. Expressed as a dimensionless ratio. Values above 1.0 indicate overcollateralisation against external obligations.

TVA (Total Verified Asset Value)

The sum of VMR, ALA, EEZ, and FWR for a given sovereign, as defined in Section 4.2.

VMR (Verified Mineral Reserve value)

In situ mineral reserve value at the 90-day rolling average commodity price applied to proven and probable certified reserve quantities.

ALA (Agricultural Land Asset value)

Net present value of agricultural productive capacity at current crop yield rates, discounted at the sovereign's weighted average cost of capital.

EEZ (Exclusive Economic Zone asset value)

Documented hydrocarbon discoveries, independently certified fisheries stocks at sustainable yield rates, and registered seabed mineral concessions within the sovereign's EEZ.

FWR (Freshwater Resource value)

Replacement cost of equivalent water storage and distribution infrastructure capacity, following WRI methodology.

ESD (External Sovereign Debt)

Total external sovereign debt as reported to the World Bank International Debt Statistics system.

MACA (Mineral-Adjusted Creditworthiness Assessment)

The composite creditworthiness framework defined in Section 5, incorporating $SAPI_{norm}$, $DSCR_{norm}$, RDI_{norm}, and ICI_{norm} with the indicative weights alpha = 0.40, beta = 0.25, gamma = 0.20, delta = 0.15.

DSCR (Debt Service Coverage Ratio)

The ratio of primary fiscal surplus plus verified commodity royalty receipts to total scheduled debt service obligations in the assessment year.

RDI (Revenue Diversification Index)

A Herfindahl-Hirschman Index-derived measure of government revenue stream concentration, normalised to 0–100.

ICI (Institutional Capacity Index)

A composite of the World Bank CPIA, Mo Ibrahim Foundation Index of African Governance, and Transparency International Corruption Perceptions Index, normalised to 0–100.

ASDFF© (African Sovereign Development Finance Fund©)

The continental capital vehicle operating under the African Federation Treaty Framework©, constitutionally co-equal with the Pan African Court℠, the Central Bank of Africa℠, and the United African Defence Force℠.

AFTF© (African Federation Treaty Framework©)

The constitutional framework for the African Federation©. Zenodo: https://doi.org/10.5281/zenodo.18365997. SSRN: 6130346.

OmniGaza®

The sovereign registry, continental intelligence, and digital transactional platform providing the operational substrate for the Sovereign Operating System. Zenodo: https://doi.org/10.5281/zenodo.15061707.

Encumbrance Adjustment Factor (EAF)

A proposed deduction from the VMR component of TVA, proportional to the share of verified export revenues subject to offshore escrow or resource-backed repayment provisions, to be incorporated in the Annual Sovereign Asset Parity Report from Q1 2027.

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AFRICA’S SOVEREIGN DEVELOPMENT TRUST®

United Nations Crescent, Gigiri, Nairobi, Kenya

P.O. Box 43112-00100, Nairobi

+254 799 504 111

thendegegroup.com | press@thendegegroup.com

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